UECM1404 Theory of Interest Tutorial 1

TUTORIAL 3

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Q1. An annuity pays 3 at the end of each year for 16 years. Another annuity pays 3.5 at the end of each year for 8 years. At an effective annual interest rate of $i, 0 < i < 1$, the present values of both annuities are equal. calculate i.

0.251

Q2. The death benefit on a life insurance policy can be paid in any of the following ways, each of which has the same present value as the death benefit:

- a perpetuity of 170 at the end of each month;
- 242.728624 at the end of each month for n years; and
- a payment of 107050.500000 at the end of n years.

Calculate the amount of the death benefit.

32,075.47

Q3. At the beginning of each year for ten years \$300 is deposited into a saving account. At a simple annual interest rate of $i\%$, the total amount in the account is \$4,485 at the end of ten years.
What would be the total amount in the account at the end of ten years if interest had been compounded at an effective annual interest rate of $i\%$.

4,968.1

Q4. Kelvin wish to accumulate 63,000 in a fund at the end of 35 years. She plans to deposit 45 into the fund at the end of of each of the first 168 months. He then plans to deposit $45 + k$ into the fund at the end of each of the last 252 months. Assume the fund earns interest at an annual effective rate 5.0600000000000005%. Determine k.

4,968.1

Q5. Tom borrows 300 at an annual effective interest rate of 7% and agrees to repay it with 30 annual installments. the amount of each payment in the last 20 years is set at twice that in the first 10 years. At the end of 10 years. Tom has the the option to repay the entire loan with a final payment X, in addition to the regular payment. This will yield the lender an annual effective rate of 7.5% over the 10-year period. Calculate X.

379.8

Q6. You took a loan of 100,000 which required to pay 25 equal annual payments at 10% interest. The payments are due at the end of each year. The bank sold your loan to an investor immediately after receiving your 8th payment. With yield to the investor of 8%, the price the investor pay was 100,491. Determine the bank's overall return on its investment.

0.1106

Q7. A perpetuity paying 1 at the beginning of each 6-month period has a present value of 990. A second perpetuity pays R at the beginning of every 7 years. Assuming the same annual effective interest rate, the two present values are equal. Determine R.

13.9085

Q8. A series of 50 payments of 5,000 each is to be made with the first payment one year hence and with each subsequent payment two years after the preceding one. The annual effective interest rate is 3.7%. Find the present value of the series of payment.

66,976.5

Q9. Kenton borrows 260,000 on January 1, 2012 to be repaid in 12 annual installments at an effective annual rate of interest of 8%. The first payment is due on January 1, 2013. Instead of annual payment he decides to make monthly payments equal to one-twelfth the annual payment beginning on February 1, 2013. Dertermine how many months will be needed to pay off the loan.

135.951

Q10. You ara given $\delta_t = 5/(17+t)$ for $0 \leq t \leq 5$. Calculate $s_{\overline{5}|}$.

8.6812